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最終頁に続く

(54)【発明の名称】 標示用粘着テープ

(57)【要約】

【課題】 焼却時にダイオキシンなどの有害物の発生が少なく、粘着力の低下率が小さく、しかも帯電防止機能を有する標示用粘着テープ。

【解決手段】 ①主成分としてポリオレフィンを含む基材の片面に粘着剤層を配置してなる粘着テープであって、該基材の表面抵抗値が $1 \times 10^{14} \Omega$ 以下であり、かつ粘着力の低下率が20%以下であることを特徴とする粘着テープ、および②主成分としてポリオレフィンを含む基材の片面に粘着剤層を配置してなる粘着テープであって、該基材に高分子型帯電防止剤を含有し、該基材の表面抵抗値が $1 \times 10^{14} \Omega$ 以下であることを特徴とする標示用粘着テープ。

【特許請求の範囲】

【請求項1】 主成分としてポリオレフィンを含有する基材の片面に粘着剤層を配置してなる粘着テープであって、該基材の表面抵抗値が $1 \times 10^{14} \Omega$ 以下であり、かつ粘着力の低下率が20%以下であることを特徴とする標示用粘着テープ。

【請求項2】 ポリオレフィンがポリエチレンおよび／またはポリプロピレンであることを特徴とする請求項1記載の標示用粘着テープ。

【請求項3】 基材が高分子型帯電防止剤を含有することを特徴とする請求項1記載の標示用粘着テープ。

【請求項4】 高分子型帯電防止剤の配合量が、基材の主成分であるポリオレフィン100重量部に対して5～50重量部であることを特徴とする請求項3記載の標示用粘着テープ。

【請求項5】 高分子型帯電防止剤が、ポリエーテルエステルアミドであることを特徴とする請求項3または4記載の標示用粘着テープ。

【請求項6】 高分子型帯電防止剤が、非帯電性エチレン共重合体アイオノマー樹脂であることを特徴とする請求項3または4記載の標示用粘着テープ。

【請求項7】 基材が多層構造である請求項1～6のいずれかに記載の標示用粘着テープ。

【請求項8】 主成分としてポリオレフィンを含有する基材の片面に粘着剤層を配置してなる粘着テープであって、該基材に高分子型帯電防止剤を含有し、該基材の表面抵抗値が $1 \times 10^{14} \Omega$ 以下であることを特徴とする標示用粘着テープ。

【請求項9】 ポリオレフィンがポリエチレンおよび／またはポリプロピレンであることを特徴とする請求項8記載の標示用粘着テープ。

【請求項10】 高分子型帯電防止剤の配合量が、基材の主成分であるポリオレフィン100重量部に対して5～50重量部であることを特徴とする請求項8記載の標示用粘着テープ。

【請求項11】 高分子型帯電防止剤が、ポリエーテルエステルアミドであることを特徴とする請求項8記載の標示用粘着テープ。

【請求項12】 高分子型帯電防止剤が、非帯電性エチレン共重合体アイオノマー樹脂であることを特徴とする請求項8記載の標示用粘着テープ。

【請求項13】 基材が多層構造である請求項8～12のいずれかに記載の標示用粘着テープ。

【発明の詳細な説明】

【0001】

【発明の属する技術分野】本発明は、帯電防止機能を有する標示用粘着テープに関する。本発明は、焼却時にダイオキシンなどの有害物を発生せず、静電気によるゴミや埃の付着が生じない標示用粘着テープに関する。

【0002】

【従来の技術】標示用粘着テープは、工場、店舗、事務所および体育館等の床面に区画を標示するラインテープや工事現場及び駅構内などで危険をしめすトラ模様テープなどに用いられる。これまでの標示用粘着テープは、基材として塩化ビニルが主に用いられている。しかし、塩化ビニルは焼却時にダイオキシンなどの有害物を発生するため、最近素材の代替が数多く検討され、ポリプロピレンなどに代替が進みつつある。

【0003】しかし、ポリプロピレンおよびポリエチレンなどは、その表面抵抗値の高さから帯電し易く、静電気によりゴミや埃が付着しやすい。このため、ポリプロピレン等を標示用粘着テープに利用した場合、表面が汚れ、美観を損ねるため、ポリプロピレン等は適さない素材であった。この問題の解決方法として、基材または粘着剤層に導電性フィラーや界面活性剤などの帯電防止剤を練り混むことが行われる。導電性フィラーを帯電防止剤として練り混んだ場合、標示用としての色が鮮明に出し難く、また目的とする帯電防止効果を得るには、大量に添加しなければならず、大幅な製造コストアップにも繋がる。

【0004】一方、界面活性剤などの帯電防止剤を練り混んだ場合、界面活性剤などが表面にブリードアウトしてそこから静電気を逃がし帯電防止効果を発揮する。しかし、界面活性剤は一般的に低分子量であるため、ブリードアウト量が安定せず、帯電防止効果に変化したり、表面を拭き取ると帯電防止効果が失われるという欠点がある。また、界面活性剤を基材に練り混んだ粘着テープをロール状に巻き戻すと粘着剤層表面に界面活性剤が移行し、粘着力が大きく低下するという致命的な問題がある。

【0005】

【発明が解決しようとする課題】従って、本発明の目的は、焼却時にダイオキシンなどの有害物の発生が少なく、粘着力の低下率が小さく、しかも帯電防止機能を有する標示用粘着テープを提供することである。

【0006】

【課題を解決するための手段】本発明者らは、上記目的を達成するため鋭意研究を行った結果、主成分としてポリオレフィンを含有する基材の片面に粘着剤層を配置してなる粘着テープであって、該基材の表面抵抗値が $1 \times 10^{14} \Omega$ 以下であり、かつ粘着力の低下率が20%以下である粘着テープが、所望の特性を有する標示用粘着テープであることを見出し、本発明を完成するに至った。即ち、本発明は、(1)主成分としてポリオレフィンを含有する基材の片面に粘着剤層を配置してなる粘着テープであって、該基材の表面抵抗値が $1 \times 10^{14} \Omega$ 以下であり、かつ粘着力の低下率が20%以下であることを特徴とする標示用粘着テープ、(2)ポリオレフィンがポリエチレンおよび／またはポリプロピレンであることを特徴とする上記(1)の標示用粘着テープ、

(3) 基材が高分子型帯電防止剤を含有することを特徴とする上記(1)の標示用粘着テープ、(4) 高分子型帯電防止剤の配合量が、基材の主成分であるポリオレフィン100重量部に対して5~50重量部であることを特徴とする上記(3)の標示用粘着テープ、(5) 高分子型帯電防止剤が、ポリエーテルエステルアミドであることを特徴とする上記(3)または(4)の標示用粘着テープ、(6) 高分子型帯電防止剤が、非常電性エチレン共重合体アイオノマー樹脂であることを特徴とする上記(3)または(4)の標示用粘着テープ、(7) 基材が多層構造である上記(1)~(6)の標示用粘着テープ、(8) 主成分としてポリオレフィンを含有する基材の片面に粘着剤層を配置してなる粘着テープであって、該基材に高分子型帯電防止剤を含有し、該基材の表面抵抗値が $1 \times 10^{14} \Omega$ 以下であることを特徴とする標示用粘着テープ、(9) ポリオレフィンがポリエチレンおよび/またはポリプロピレンであることを特徴とする上記(8)の標示用粘着テープ、(10) 高分子型帯電防止剤の配合量が、基材の主成分であるポリオレフィン100重量部に対して5~50重量部であることを特徴とする上記(8)の標示用粘着テープ、(11) 高分子型帯電防止剤が、ポリエーテルエステルアミドであることを特徴とする上記(8)の標示用粘着テープ、(12) 高分子型帯電防止剤が、非常電性エチレン共重合体アイオノマー樹脂であることを特徴とする上記(8)の標示用粘着テープ、および(13) 基材が多層構造である上記(8)~(12)の標示用粘着テープに関する。

【0007】

【発明の実施の形態】以下、本発明を詳細に説明する。本発明における基材の表面抵抗値は、25℃、65%RH条件下、JIS K6911で測定した値であり、好ましくは $1 \times 10^{14} \Omega$ 以下、特に好ましくは $1 \times 10^{13} \Omega$ 以下である。基材の表面抵抗値が $1 \times 10^{14} \Omega$ を越える場合、該基材を有する粘着テープは静電気によってゴミや埃などの付着により表面が汚れ易くなる。

【0008】本発明における標示用粘着テープの粘着力の低下率は20%以下、好ましくは10%以下である。該「粘着力の低下率」とは、後記測定方法により測定した粘着力により算出され、室温保存品(室温で2日間保存した標示用粘着テープ)の粘着力に対する保存品(70℃、2d)(70℃で2日間保存した標示用粘着テープ)の粘着力の差を、室温保存品の粘着力に対する百分率で示したものである。

【0009】本発明における基材の表面抵抗値を $1 \times 10^{14} \Omega$ 以下とする方法として、①界面活性剤を基材表面に塗布したり、基材に練りこませたりする方法、②カーボンブラックや金属などの導電性物質を基材に配合する方法、③高分子型帯電防止剤を基材に配合する方法が挙げられ、好ましくは上記③の方法が挙げられる。

【0010】本発明における標示用粘着テープの粘着力

の低下率を20%以下とする方法としては、①導電性物質を粘着テープに配合する方法、②高分子型帯電防止剤を粘着テープに配合する方法が挙げられ、好ましくは透明性や着色性の点から上記②の方法が好ましい。尚、界面活性剤を粘着テープ表面に塗布したり、粘着テープに練りこんだりした場合には、粘着力の低下率が20%を超えることになる。

【0011】本発明で使用する高分子型帯電防止剤として、好ましくはポリエーテルエステルアミド、およびアイオノマーが挙げられる。

【0012】本発明におけるポリエーテルエステルアミドとは、ポリアミド形成性モノマーおよびジカルボン酸から誘導される反応性末端を有するポリアミドと反応性末端を有するポリエーテルジオールとを重縮合させて得られるものであり、ランダム共重合だけでなく、ブロック共重合体をも包含する。

【0013】該ポリアミド形成性モノマーとしては、例えばアミノカルボン酸(例えば、 ω -アミノカプロン酸、 ω -アミノエナント酸、 ω -アミノカプリル酸、 ω -アミノヘラルゴン酸、 ω -アミノカプリン酸、11-アミノウンデカン酸、12-アミノドデカン酸など)、ラクタム(例えば、カプロラクタム、エナントラクタム、ラウロラクタム、ウンデカンラクタムなど)、ナイロン塩(例えば、ヘキサメチレンジアミン-アジピン酸塩、ヘキサメチレンジアミン-セバシン酸塩、ヘキサメチレンジアミン-テレフタル酸塩など)などが挙げられる。これらは、単独または2種以上を併用してもよい。これらのうち、好ましいものとしては、 ω -アミノカプロン酸、12-アミノドデカン酸、カプロラクタム、ラウロラクタムおよびヘキサメチレンジアミン-アジピン酸塩などの脂肪族ポリアミド形成性モノマーが挙げられ、特に好ましくはカプロラクタムが挙げられる。

【0014】ジカルボン酸としては、例えば、分子内に環状構造を有するジカルボン酸(例えば1,2-シクロヘキサンジカルボン酸、1,4-シクロヘキサンジカルボン酸、ジシクロヘキシル-4,4'-ジカルボン酸、テレフタル酸、イソフタル酸、フタル酸、ナフタレン-2,7-ジカルボン酸、ジフェノキシエタンジカルボン酸、ジフェニル-4,4'-ジカルボン酸、3-スルホイソフタル酸ナトリウム、3-スルホイソフタル酸カリウム、およびこれらの2種以上の混合物など)分子内に環状構造を有さない直鎖状または分岐鎖状ジカルボン酸(例えば、アジピン酸、アゼライン酸、セバシン酸、ウンデカンジ酸、ドデカンジ酸、およびこれらの2種以上の混合物など)などが挙げられる。これらは単独または2種以上を併用してもよい。

【0015】本発明のポリアミドは通常のポリアミドの製造方法と同様にして、製造することができる。該ポリアミドの数平均分子量は、300~10000、好ましくは500~5000である。

【0016】本発明におけるポリエーテルジオールとしては、好ましくはポリオキシアルキレングリコールおよびビスフェノール類のアルキレンオキシド付加物が挙げられ、これらは単独または2種以上を併用してもよく、特に好ましくはビスフェノール類のアルキレンオキシド付加物が挙げられる。該ポリオキシアルキレングリコールとしては、例えばポリオキシエチレングリコール、ポリオキシプロピレングリコール、ポリオキシテトラメチレングリコール、ポリオキシヘキサメチレングリコール、ポリオキシエチレンオキシドとポリオキシプロピレンオキシドとの共重合ジオール、およびこれらの2種以上の混合物などが挙げられる。これらのうち、ポリオキシエチレングリコールが帯電防止性の点から特に好ましい。該ビスフェノール類のアルキレンオキシド付加物としては、例えばビスフェノールA(4, 4'-ジヒドロキシジフェニル-2, 2-プロパン)、ビスフェノールF(4, 4'-ジヒドロキシジフェニルメタン)、ビスフェノールS(4, 4'-ジヒドロキシジフェニルスルホン)、4, 4'-ジヒドロキシジフェニル-2, 2-ブタンなどのビスフェノール類のエチレンオキシド付加物が挙げられ、好ましくはビスフェノールAおよびビスフェノールSのエチレンオキシド付加物が挙げられる。本発明の目的を阻害しない範囲であれば、これら以外のジヒドロキシ化合物を含んでいてもよく、例えばエチレングリコール、プロピレングリコール、ブタンジオール、ジエチレングリコール、シクロヘキサンジオール、水素添加ポリブタンジエングリコールなどが挙げられる。

【0017】ポリエーテルジオールの数平均分子量は、好ましくは300~5000である。

【0018】本発明で使用するポリエーテルエステルアミドは、以下の方法により得ることができる。①上記ポリアミド形成性モノマーとジカルボン酸との反応させてポリアミドを得、これにポリエーテルジオールを添加し、高温、減圧下で重合反応を行なう方法。②上記ポリアミド形成性モノマー、ジカルボン酸およびポリエーテルジオールを同時に反応槽に仕込み、水の存在下または非存在下に、高温で、加圧反応させることによって中間体としてポリアミドを形成させ、その後、減圧下で該ポリアミドとポリエーテルジオールとの重合反応を行なう方法。

【0019】上記の重合反応に際しては、通常エステル化触媒が使用される。該触媒としては、リン酸などのプロトン酸、アルカリ金属、アルカリ土類金属、遷移金属、2B金属、4B金属および5B金属の有機酸塩、炭酸塩、硫酸塩、リン酸塩、酸化物、塩化物、水酸化物、アルコキシドなどが挙げられる。該触媒の使用量は、通常、ポリアミド形成性モノマー、ジカルボン酸およびポリエーテルジオールの合計重量に対して、0.001~5重量%である。

【0020】該ポリエーテルエステルアミドの基材への添加は、マスターバッチ、または基材の主成分であるポリオレフィンの構成成分と同じ成分に帯電防止剤を分散させ、ペレット状にしたもの(以下、マスターペレットとする)を経由して行う。該マスターペレットとして、例えば三洋化成工業(株)製「ペレスタットシリーズ」を利用することができる。

【0021】本発明における非帯電性エチレン共重合体アイオノマー樹脂とは、アルカリ金属をイオン源とする非帯電性エチレン共重合体アイオノマー樹脂であり、エチレン・不飽和カルボン酸ランダム共重合体のカルボキシル基の一部もしくは全部が、アルカリ金属で中和された構造のものをいい、帯電防止効果を有するものであれば特に制限されるものではない。該アイオノマーは、含有されるカルボキシル基を全て陽イオンで中和されていなくてもよい。

【0022】上記不飽和カルボン酸として、好ましくはアクリル酸、メタクリル酸などが挙げられる。上記アルカリ金属として、好ましくはリチウム、ナトリウム、カリウムなどが挙げられる。

【0023】基材における高分子型帯電防止剤の配合量は、基材の主成分であるポリオレフィン100重量部に対して5~50重量部、好ましくは5~30重量部である。該ポリエーテルエステルアミドの配合量が基材の主成分であるポリオレフィン100重量部に対して5重量部未満になると、帯電防止効果が乏しくなり、50重量部を越えると基材の物性(引張強度、伸長率、弾性率および引裂き強度)が大きく変わり、さらにコストが高くなる。

【0024】本発明で使用する基材の主成分はポリオレフィンであり、該ポリオレフィンとしては、例えば、ポリエチレン、ポリプロピレン;エチレン-プロピレン共重合体、エチレン-酢酸ビニル共重合体、エチレン-メタクリル酸共重合体、プロピレン-酢酸ビニル共重合体、およびプロピレン-メタクリル酸共重合体などのオレフィンと不飽和化合物との共重合体、並びにこれらの混合物が挙げられ、好ましくはポリエチレン、ポリプロピレン、エチレン-プロピレン共重合体、並びにこれらの混合物が挙げられる。

【0025】本発明の標示用粘着テープにおける基材には、標示のための着色剤を添加することができる。本発明で使用する着色剤は、通常用いられるものでよく、例えば市販されている練りこみ型着色顔料などが挙げられ、基材への添加形態としては、ペレットのドライブレンドが挙げられる。

【0026】着色剤の使用量は、基材100重量部に対して1~50重量部、好ましくは2~30重量部である。

【0027】本発明の基材は、主成分としてポリオレフィン含有し、さらに着色剤、および帯電防止剤を含有

する。さらに、着色剤および帯電防止剤以外の添加剤として、必要に応じて、本発明の目的を阻害しない範囲で酸化防止剤、紫外線吸収剤、滑剤、ブロッキング防止剤などを含有してもよい。

【0028】本発明の基材は、通常の成形方法で生成でき、例えば押し出し成形（例えばインフレーション法、Tダイ法）、カレンダー加工などが挙げられ、成形温度は200～270℃である。

【0029】本発明の粘着テープは、粘着剤層と基材とからなり、該基材の粘着剤と接する面に、必要によりコロナ放電などの接着性を高めるような表面処理を施してもよい。また、該基材の粘着剤と接しない面に必要により、離型剤の塗布などの巻き戻しを軽減するような表面処理を施してもよい。

【0030】本発明で使用する粘着剤は、例えばアクリル系、天然ゴム系、合成ゴム系、エチレン-酢酸ビニル共重合体、エチレン-アクリル酸エステル系、スチレン-イソブレンブロック共重合体系、およびスチレン-ブタジエンブロック共重合体系が挙げられ、これらを1種または2種以上用いてもよく、貼り合わせる被着体に合わせて、これらの中から選択すればよい。

【0031】本発明の粘着剤には、必要に応じてスリッパ剤、酸化防止剤などの添加剤を含有してもよい。

【0032】本発明の標示用粘着テープは、通常の粘着テープの作製方法と同様に行うことができ、例えば粘着剤を加熱溶融した後、これを上記方法により成形した基材に塗布することにより得ることができる。

【0033】基材および粘着剤層の厚みは用途によって異なり、基材の厚みは10～2000μm、好ましくは30～800μmであり、粘着剤層の厚みは5～300μm、好ましくは10～180μmである。

【0034】本発明の基材は単層または多層構造であ

り、多層構造の基材において少なくとも粘着剤層を配置していない側の最外層の表面抵抗値が $1 \times 10^{14} \Omega$ 以下であればよく、本発明の目的を阻害しない範囲であれば、上記ポリオレフィンを主成分として含有する層以外の第3層を、最外層以外に配置していてもよい。第3層としては、粘着剤と密着性のよい樹脂からなる層であれば特に限定はない。

【0035】

【実施例】本発明を実施例および比較例を挙げて、以下に詳細に説明するが、本発明はこれらに限定されるものではない。

実施例1

プロピレンホモポリマー（住友化学工業（株）製ノーブレンFS-2011D）70重量部、白色カラーベレット（大日本インキ化学工業（株）PEONY）10重量部、およびポリエーテルエステルアミドを含有したマスターベレット（三洋化成工業（株）製ベレスタット3170）20重量部をドライブレンドし、T型ダイス押し出し成形機（40mmφ）にて樹脂温度220℃で押し出して厚さ100μmのフィルムを成形した。フィルムの片面にシリコン系離型剤（信越化学工業（株）製KN S-309/PL-8=100/2重量比混合物）を1.0μmの厚さで塗布し、もう一方の面にスチレン-イソブレン共重合体系粘着剤（シェル化学（株）製クレイトン1107/ヤスハラケミカル（株）製クリアロンM-105=50/50重量比混合物）を50μmの厚さで塗布し、標示用粘着テープを得た。

【0036】実施例2～5、比較例1～4

表1または2のような配合よりなる基材を使用して、実施例1と同様にして標示用粘着テープを得た。

【0037】

【表1】

実施例	主成分 (配合量)	着色剤 (配合量)	帯電防止剤 (配合量)
1	プロピレン (70)	カラーベレット (10)	ポリエーテルエステルアミド (20)
2	プロピレン (80)	カラーベレット (10)	ポリエーテルエステルアミド (10)
3	エチレン-プロピレン (70)	カラーベレット (10)	ポリエーテルエステルアミド (20)
4	プロピレン (70)	カラーベレット (10)	アイオノマー (20)
5	プロピレン (80)	カラーベレット (10)	アイオノマー (10)

【0038】

【表2】

比較例	主成分 (配合量)	着色剤 (配合量)	帯電防止剤 (配合量)
1	プロピレン (90)	カラーベレット (10)	—
2	エチレン-プロピレン (90)	カラーベレット (10)	—
3	エチレン-プロピレン (80)	カラーベレット (10)	プラスチック用 1 (10)
4	エチレン-プロピレン (80)	カラーベレット (10)	プラスチック用 2 (10)

【0039】表1および2での各略語の意味を以下に示す。また、表中の配合量は全て重量部である。

主成分

プロピレン：プロピレンホモポリマー（住友化学工業（株）製ノーブレンFS-2011D）

エチレン-プロピレン：エチレン-プロピレンランダム共重合体（住友化学工業（株）製ノーブレンS-131）

着色剤

カラーベレット：白色カラーベレット（大日本インキ化学工業（株）製PEONY）

帯電防止剤

ポリエーテルエステルアミド：ポリエーテルエステルアミドを含有したマスターベレット（三洋化成工業（株）製ベレスタット3170）

アイオノマー：アルカリ金属をイオン源とする非帯電性エチレン共重合体アイオノマー樹脂（三井・デュポンポリケミカル（株）製SD-100）

プラスチック用1：多価アルコール系誘導体のプラスチック用帯電防止剤（第一工業製薬（株）製レジスタットPE132）/エチレン-プロピレンランダム共重合体（住友化学工業（株）製ノーブレンS-131）（5重量部/95重量部）を二軸混練り機でマスターバッチ化したもの

プラスチック用2：多価アルコール系誘導体のプラスチック用帯電防止剤（第一工業製薬（株）製レジスタットPE139）/エチレン-プロピレンランダム共重合体（住友化学工業（株）製ノーブレンS-131）（5重量部/95重量部）を二軸混練り機でマスターバッチ化したもの

【0040】実験例

上記の実施例1～5および比較例1～4で得られた標示用粘着テープに対する各特性試験を、以下に行った。得られた結果を表3に示す。

①粘着力

室温で2日間保存した標示用粘着テープ（室温保存品）、および70℃で2日間保存した標示用粘着テープ（保存品（70℃、2d））を、それぞれ20mm幅にカットし、ステンレス板に2kgのゴムローラーを1往復させて貼り付け、23℃で30分放置後、引っ張り速度300mm/分、剥離角度180°の条件で引っ張り試験機にて粘着力（室温保存品、保存品（70℃、2d）の粘着力をそれぞれA1、A2とする）を測定した。得られた粘着力（A1、A2）と下式から、粘着力の低下率を算出した。

【0041】

【数1】

$$\text{粘着力の低下率} = \frac{A1 - A2}{A1} \times 100$$

【0042】②被着体への汚染性

上記の粘着試験で得られた、標示用粘着テープ（保存品（70℃、2d））を剥離した後のステンレス板表面における汚染の有無を目視により評価した。

○：汚染なし、×：汚染あり

【0043】③表面抵抗値

JIS K 6911「熱硬化性プラスチック一般試験方法」に規定の方法に準じて、25℃、65%RHの雰囲気下で、標示用粘着テープの表面、つまり離型処理面の表面抵抗値を測定した。

【0044】④表面汚れ性

標示用粘着テープを幅50mm×長さ2mにカットし、これをウレタン塗装した事務所の床面に貼り付け、1週間後のテープ表面の汚れを目視にて判定した。

○：汚れなし、×：汚れあり

【0045】

【表3】

	粘着力 (gf/20mm)			被着体 への 汚染性	表面 抵抗値 (Ω)	表面 汚れ性
	室温 保存品	保存品 (70℃, 2日)	低下率 (%)			
実施例 1	2200	2100	5	○	2×10^{11}	○
実施例 2	2250	2160	4	○	5×10^{10}	○
実施例 3	2000	1900	5	○	3×10^{11}	○
実施例 4	2240	2120	5	○	2×10^{11}	○
実施例 5	2300	2180	5	○	7×10^{10}	○
比較例 1	2400	2300	4	○	6×10^{10}	×
比較例 2	2000	1910	5	○	4×10^{10}	×
比較例 3	1900	620	67	×	2×10^{11}	○
比較例 4	1850	430	77	×	2×10^{11}	○

【0046】表3より、表面抵抗値が高い粘着テープの場合（比較例1および2）、粘着テープの表面が汚れ易くなり、粘着力の低下率が大きい粘着テープの場合（比較例3および4）、被着体への汚染を引き起こすことが分かった。これに比べ、本発明の場合には、表面抵抗値が低いためテープ表面に汚れが付着せず、かつ粘着力の低下率が小さいため被着体を汚染しないことが分かった。

【0047】

【発明の効果】本発明により、焼却によるダイオキシンなどの有害物の発生が少なく、粘着力の低下率が小さく、帯電防止効果を有する標示用粘着テープを提供することができる。これにより、本発明の標示用粘着テープを、工場、店舗、事務所、体育館、工場現場、および駅構内などで使用することができる。

フロントページの続き

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(54) ADHESIVE TAPE FOR INDICATION

(57)Abstract:

PROBLEM TO BE SOLVED: To obtain an adhesive tape for indication slightly generating a harmful substance such as dioxins during incineration, having a low reduction ratio of adhesive strength and antistatic function.

SOLUTION: (1) This adhesive tape is characterized in that the adhesive tape is obtained by laying an adhesive layer on one side of a substrate comprising a polyolefin as a main component, the surface resistance value of the substrate is $\leq 1 \times 10^{14} \Omega$ and the reduction ratio of adhesive strength is $\leq 20\%$. (2) The adhesive tape is characterized in that the adhesive tape is obtained by laying an adhesive layer on one side of a substrate comprising a polyolefin as a main component, the substrate contains a polymer type antistatic agent and the surface resistance value of the substrate is $\leq 1 \times 10^{14} \Omega$.

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CLAIMS

[Claim(s)]

[Claim 1] Adhesive tape for display characterized by being the adhesive tape which comes to arrange a binder layer on one side of the base material which contains polyolefine as a principal component, and for the surface-electrical-resistance value of this base material being 1×10^{14} ohms or less, and the decreasing rate of adhesion being 20% or less.

[Claim 2] Adhesive tape for display according to claim 1 characterized by polyolefines being polyethylene and/or polypropylene.

[Claim 3] Adhesive tape for display according to claim 1 characterized by a base material containing a macromolecule mold antistatic agent.

[Claim 4] Adhesive tape for display according to claim 3 with which the loadings of a macromolecule mold antistatic agent are characterized by being 5 - 50 weight section to the polyolefine 100 weight section which is the principal component of a base material.

[Claim 5] Adhesive tape for display according to claim 3 or 4 with which a macromolecule mold antistatic agent is characterized by being a polyether ester amide.

[Claim 6] Adhesive tape for display according to claim 3 or 4 with which a giant-molecule mold antistatic agent is characterized by being un-charging nature ethylene copolymer ionomer resin.

[Claim 7] Adhesive tape for display according to claim 1 to 6 whose base material is multilayer structure.

[Claim 8] Adhesive tape for display which is adhesive tape which comes to arrange a binder layer on one side of the base material which contains polyolefine as a principal component, contains a macromolecule mold antistatic agent in this base material, and is characterized by the surface-electrical-resistance value of this base material being 1×10^{14} ohms or less.

[Claim 9] Adhesive tape for display according to claim 8 characterized by polyolefines being polyethylene and/or polypropylene.

[Claim 10] Adhesive tape for display according to claim 8 with which the loadings of a macromolecule mold antistatic agent are characterized by being 5 - 50 weight section to the polyolefine 100 weight section which is the principal component of a base material.

[Claim 11] Adhesive tape for display according to claim 8 with which a macromolecule mold antistatic agent is characterized by being a polyether ester amide.

[Claim 12] Adhesive tape for display according to claim 8 with which a giant-molecule mold antistatic agent is characterized by being un-charging nature ethylene copolymer ionomer resin.

[Claim 13] Adhesive tape for display according to claim 8 to 12 whose base material is multilayer structure.

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Field of the Invention] This invention relates to the adhesive tape for display which has an antistatic function. This invention does not generate deleterious material, such as dioxin, at the time of incineration, but relates to the adhesive tape for display which adhesion of the dust by static electricity or dust does not produce.

[0002]

[Description of the Prior Art] The adhesive tape for display carries out risk by the line tape, a construction site, a yard which display a partition to the floor line of works, a store, an administration building, a gymnasium, etc., and is used for the tape of a female truck pattern etc. As for the old adhesive tape for display, the vinyl chloride is mainly used as a base material. However, since a vinyl chloride generates deleterious material, such as dioxin, at the time of incineration, many alternatives of a raw material are considered recently and an alternative is progressing to polypropylene etc.

[0003] However, polypropylene, polyethylene, etc. tend to be charged from the height of the surface-electrical-resistance value, and dust and dirt tend to adhere with static electricity. For this reason, since a front face spoiled dirt and a fine sight when polypropylene etc. is used for the adhesive tape for display, polypropylene etc. was a raw material which is not suitable. It is performed that scour antistatic agents, such as a conductive filler and a surfactant, in a base material or a binder layer, and it is crowded in it as the solution approach of this problem. When a conductive filler is scoured as an antistatic agent and it is crowded, in order to acquire the antistatic effectiveness which the color as an object for display cannot take out easily vividly, and makes the object, it must add to a large quantity and leads also to a steep manufacturing-cost rise.

[0004] On the other hand, when antistatic agents, such as a surface active agent, are scoured and it is crowded, a surface active agent etc. carries out bleed out to a front face, static electricity is missed from there, and the antistatic effectiveness is demonstrated. However, since it is generally low molecular weight, the amount of bleed out of a surface active agent is not stable, and when the antistatic effectiveness changes or a front face is wiped off, it has the fault that the antistatic effectiveness is lost. Moreover, if the adhesive tape which scoured the surfactant to the base material and was crowded is rewound in the shape of a roll, a surfactant will shift to a binder layer front face, and there is a fatal problem that adhesion declines greatly.

[0005]

[Problem(s) to be Solved by the Invention] Therefore, as for the object of this invention, there is little generating of deleterious material, such as dioxin, at the time of incineration, and its decreasing rate of adhesion is small, and it is offering the adhesive tape for display which moreover has an antistatic function.

[0006]

[Means for Solving the Problem] In order that this invention persons may attain the above-mentioned object, as a result of inquiring wholeheartedly, the adhesive tape whose decreasing rate of adhesion it is the adhesive tape which comes to arrange a binder layer on one side of the

base material which contains polyolefine as a principal component, and the surface-electrical-resistance value of this base material is 1×10^{14} ohms or less, and is 20% or less came to complete a header and this invention for it being the adhesive tape for display which has a desired property. Namely, this invention is adhesive tape which comes to arrange a binder layer on one side of the base material which contains polyolefine as (1) principal component. The adhesive tape for display characterized by for the surface-electrical-resistance value of this base material being 1×10^{14} ohms or less, and the decreasing rate of adhesion being 20% or less, (2) Adhesive tape for display of the above (1) characterized by polyolefines being polyethylene and/or polypropylene, (3) Adhesive tape for display of the above (1) characterized by a base material containing a macromolecule mold antistatic agent, (4) Adhesive tape for display of the above (3) with which the loadings of a macromolecule mold antistatic agent are characterized by being 5 – 50 weight section to the polyolefine 100 weight section which is the principal component of a base material, (5) The above (3) or (4) adhesive tape for display with which a macromolecule mold antistatic agent is characterized by being a polyether ester amide, (6) The above (3) or (4) adhesive tape for display with which a giant-molecule mold antistatic agent is characterized by being un-charging nature ethylene copolymer ionomer resin, (7) Adhesive tape for display of above-mentioned (1) – (6) whose base material is multilayer structure, (8) It is the adhesive tape which comes to arrange a binder layer on one side of the base material which contains polyolefine as a principal component. The adhesive tape for display which contains a macromolecule mold antistatic agent in this base material, and is characterized by the surface-electrical-resistance value of this base material being 1×10^{14} ohms or less, (9) Adhesive tape for display of the above (8) characterized by polyolefines being polyethylene and/or polypropylene, (10) Adhesive tape for display of the above (8) with which the loadings of a macromolecule mold antistatic agent are characterized by being 5 – 50 weight section to the polyolefine 100 weight section which is the principal component of a base material, (11) Adhesive tape for display of the above (8) with which a macromolecule mold antistatic agent is characterized by being a polyether ester amide, (12) It is related with the adhesive tape for display of the above (8) with which a giant-molecule mold antistatic agent is characterized by being un-charging nature ethylene copolymer ionomer resin, and the adhesive tape for display of above-mentioned (8) – (12) whose (13) base materials are multilayer structure.

[0007]

[Embodiment of the Invention] Hereafter, this invention is explained to a detail. The surface-electrical-resistance value of the base material in this invention is the bottom of 25 degrees C and 65%RH condition, and JIS. It is the value measured by K6911, and 1×10^{14} ohms or less are 1×10^{13} ohms or less especially preferably preferably. When the surface-electrical-resistance value of a base material exceeds 1×10^{14} ohms, a front face dirt-comes to be [with static electricity] easy of the adhesive tape which has this base material with adhesion of dust, dust, etc.

[0008] The decreasing rate of the adhesion of the adhesive tape for display in this invention is 10% or less preferably 20% or less. It is computed by the adhesion measured with the after-mentioned measuring method, and the difference of the adhesion of the preservation article (70 degrees C, 2d) (adhesive tape for display saved for two days at 70 degrees C) to the adhesion of a room temperature preservation article (adhesive tape for display saved for two days at the room temperature) is indicated to be ** "the decreasing rate of adhesion" by the percentage to the adhesion of a room temperature preservation article.

[0009] As an approach of setting the surface-electrical-resistance value of the base material in this invention to 1×10^{14} ohms or less, ** surface active agent is applied to a base material front face, or the approach of blending with a base material conductive matter which scours to a base material, and is been [matter / it / is made full / matter / and] sufficient and used as it, such as an approach and ** carbon black metallurgy group, and the approach of blending ** macromolecule mold antistatic agent with a base material are mentioned, and the approach of the above-mentioned ** is mentioned preferably.

[0010] As an approach of making the decreasing rate of the adhesion of the adhesive tape for

adhesive tape and the approach of blending ** macromolecule mold antistatic agent with adhesive tape are mentioned, and the approach of the above-mentioned ** is preferably desirable from the point of transparency or coloring nature. In addition, when it scoured to adhesive tape, and it is crowded or carries out [**** / applying a surfactant to an adhesive tape front face], the decreasing rate of adhesion will exceed 20%.

[0011] As a macromolecule mold antistatic agent used by this invention, a polyether ester amide and an ionomer are mentioned preferably.

[0012] The polyether ester amide in this invention carries out the polycondensation of the polyamide which has the reactant end guided from a polyamide plasticity monomer and dicarboxylic acid, and the polyether diol which has a reactant end, is obtained, and includes not only random copolymerization but a block copolymer.

[0013] As this polyamide plasticity monomer, amino carboxylic acids (for example, omega-aminocaproic acid, omega-amino enanthic acid, omega-amino caprylic acid, omega-amino ** RARUGON acid, omega-amino capric acid, 11-amino undecanoic acid, 12-amino dodecanoic acid, etc.), lactams (for example, a caprolactam, an ENANTO lactam, a RAURO lactam, an undecane lactam, etc.), nylon salt (for example, hexamethylenediamine-adipate, a hexamethylenediamine-sebacic-acid salt, a hexamethylenediamine-terephthalic-acid salt, etc.), etc. are mentioned, for example. These may use together independent or two sorts or more. Among these, as a desirable thing, aliphatic series polyamide plasticity monomers, such as omega-aminocaproic acid, 12-amino dodecanoic acid, a caprolactam, a RAURO lactam, and hexamethylenediamine-adipate, are mentioned, and a caprolactam is mentioned especially preferably.

[0014] the dicarboxylic acid (for example, 1 and 2-cyclohexane dicarboxylic acid —) which has cyclic structure in intramolecular as dicarboxylic acid, for example To 1, 4-cyclohexane dicarboxylic acid, and JISHIKURO, KISHIRU -4, 4'-dicarboxylic acid, A terephthalic acid, isophthalic acid, a phthalic acid, naphthalene -2, 7-dicarboxylic acid, Difenoxycarboxylic acid, diphenyl -4, 4'-dicarboxylic acid, 3-sulfoisophtharate sodium, 3-sulfoisophtharate potassium, And the shape of a straight chain, branched-chain dicarboxylic acid, etc. (for example, an adipic acid, an azelaic acid, a sebacic acid, a UNDEKANJI acid, DODEKANJI acids, two or more sorts of such mixture, etc.) which does not have cyclic structure are mentioned to intramoleculars, such as two or more sorts of such mixture. These may use together independent or two sorts or more.

[0015] The polyamide of this invention can be manufactured like the manufacture approach of the usual polyamide. the number average molecular weight of this polyamide — 300-10000 — it is 500-5000 preferably.

[0016] As polyether diol in this invention, the alkylene oxide addition product of polyoxy alkylene glycol and bisphenols is mentioned preferably, these being independent or two sorts or more may be used together, and the alkylene oxide addition product of bisphenols is mentioned especially preferably. As this polyoxy alkylene glycol, polyoxy ethylene glycol, a polyoxypropylene glycol, polyoxy tetramethylene glycol, polyoxy hexamethylene glycol, the copolymerization diols of polyoxy ethylene oxide and polyoxy propylene oxide, two or more sorts of such mixture, etc. are mentioned, for example. Polyoxy ethylene glycol is [among these] desirable especially from the point of antistatic nature. As an alkylene oxide addition product of these bisphenols, the ethylene oxide addition product of bisphenols, such as bisphenol A (4 and 4'-dihydroxydiphenyl -2, 2-propane), Bisphenol F (4 and 4'-dihydroxy diphenylmethane), Bisphenol S (4 and 4'-dihydroxy diphenylsulfone), 4, and 4'-dihydroxydiphenyl -2 and 2-butane, is mentioned, for example, and bisphenol A and the ethylene oxide addition product of Bisphenol S are mentioned preferably. If it is the range which does not check the object of this invention, dihydroxy compounds other than these may be included, for example, ethylene glycol, propylene glycol, butanediol, a diethylene glycol, cyclohexane diol, a hydrogenation poly butane diene glycol, etc. will be mentioned.

[0017] The number average molecular weight of polyether diol is 300-5000 preferably.

[0018] The polyether ester amide used by this invention can be obtained by the following approaches. ** The approach of the above-mentioned polyamide plasticity monomer and dicarboxylic acid of making it reacting, obtaining a polyamide, adding polyether diol to this, and

How to teach the above-mentioned polyamide plasticity monomer, dicarboxylic acid, and polyether diol simultaneously to a reaction vessel, to make a polyamide form in the bottom of existence of water or nonexistence as an intermediate product by carrying out an application-of-pressure reaction at an elevated temperature, and to perform the polymerization reaction of this polyamide and polyether diol under reduced pressure after that.

[0019] On the occasion of the above-mentioned polymerization reaction, an esterification catalyst is usually used. As this catalyst, the organic-acid salt of proton acid, such as a phosphoric acid, alkali metal, alkaline earth metal, transition metals, 2B metal, 4B metals, and 5B metals, a carbonate, a sulfate, phosphate, an oxide, a chloride, a hydroxide, an alkoxide, etc. are mentioned. The amount of this catalyst used is usually 0.001 – 5 % of the weight to the sum total weight of a polyamide plasticity monomer, dicarboxylic acid, and polyether diol.

[0020] The addition to the base material of this polyether ester amide makes the same component as the constituent of a masterbatch or the polyolefine which is the principal component of a base material distribute an antistatic agent, and is performed via what was made into the pellet type (it considers as a master pellet hereafter). As this master pellet, for example, the "PERESUTATTO series" by Sanyo Chemical Industries, Ltd. can be used.

[0021] The un-charging nature ethylene copolymer ionomer resin in this invention is un-charging nature ethylene copolymer ionomer resin which makes alkali metal the ion source, and the thing of the structure neutralized with alkali metal is said, and a part or all of a carboxyl group of ethylene and an unsaturated-carboxylic-acid random copolymer will not be restricted especially if it has the antistatic effectiveness. This ionomer does not need to be neutralized by the cation in all the carboxyl groups to contain.

[0022] As the above-mentioned unsaturated carboxylic acid, an acrylic acid, a methacrylic acid, etc. are mentioned preferably. As the above-mentioned alkali metal, a lithium, sodium, a potassium, etc. are mentioned preferably.

[0023] the polyolefine 100 weight section whose loadings of the macromolecule mold antistatic agent in a base material are the principal component of a base material — receiving — 5 – 50 weight section — it is 5 – 30 weight section preferably. If the loadings of this polyether ester amide become under 5 weight sections to the polyolefine 100 weight section which is the principal component of a base material, the antistatic effectiveness will become scarce, if 50 weight sections are exceeded, the physical properties (tensile strength, the rate of expanding, an elastic modulus, and tear strength) of a base material will change a lot, and cost will become high further.

[0024] The principal component of the base material used by this invention is polyolefine, as this polyolefine, such mixture is mentioned to the copolymer of olefins, such as polyethylene, polypropylene; ethylene propylene rubber, an ethylene-vinylacetate copolymer, an ethylene-methacrylic-acid copolymer, a propylene-vinyl acetate copolymer, and a propylene-methacrylic-acid copolymer, and an unsaturated compound, and a list, and such mixture is preferably mentioned to polyethylene, polypropylene, ethylene propylene rubber, and a list, for example.

[0025] The coloring agent for display can be added in the base material in the adhesive tape for display of this invention. the coloring agent used by this invention is usually used, and is easy to be marketed — it scours, and it is crowded, a mold color pigment etc. is mentioned, and the dryblend of a pellet is mentioned as an addition gestalt to a base material.

[0026] the amount of the coloring agent used — the base material 100 weight section — receiving — 1 – 50 weight section — it is 2 – 30 weight section preferably.

[0027] The base material of this invention contains polyolefine as a principal component, and contains a coloring agent and an antistatic agent further. Furthermore, an anti-oxidant, an ultraviolet ray absorbent, lubricant, an antiblocking agent, etc. may be contained as additives other than a coloring agent and an antistatic agent in the range which does not check the object of this invention if needed.

[0028] The base material of this invention can be generated by the usual shaping approach, for example, extrusion molding (for example, a tubular film process, a T-die method), calendering, etc. are mentioned, and molding temperature is 200–270 degrees C. [0029] The adhesive tape of

raises adhesive properties, such as corona discharge, to the field which touches the binder of this base material as occasion demands may be performed. Moreover, surface treatment which mitigates rewinding [of spreading of a release agent etc.] may be performed to the field which does not touch the binder of this base material as occasion demands.

[0030] Acrylic, a natural rubber system, a synthetic-rubber system, an ethylene-vinylacetate copolymer, an ethylene-acrylic ester system, a styrene-isoprene block-copolymer system, and a styrene-butadiene block-copolymer system are mentioned, two or more sorts may be used and the binder used by this invention should just choose these from these according to one sort or the adherend to stick.

[0031] In the binder of this invention, additives, such as a slipping agent and an antioxidant, may be contained if needed.

[0032] The adhesive tape for display of this invention can be obtained by applying this to the base material fabricated by the above-mentioned approach, after being able to carry out like the production approach of the usual adhesive tape, for example, carrying out heating fusion of the binder.

[0033] The thickness of a base material and a binder layer changes with applications, 10-2000 micrometers of thickness of a base material are 30-800 micrometers preferably, and 5-300 micrometers of thickness of a binder layer are 10-180 micrometers preferably.

[0034] The base material of this invention is a monolayer or multilayer structure, and that the surface-electrical-resistance value of the outermost layer of drum of the side which does not arrange the binder layer at least in the base material of multilayer structure should just be 1×10^{14} ohms or less, as long as it is range which does not check the object of this invention, it may arrange the 3rd layer other than the layer which contains the above-mentioned polyolefine as a principal component in addition to an outermost layer of drum. If it is the layer which consists of a binder and good resin of adhesion as the 3rd layer, there will be especially no definition.

[0035]

[Example] Although an example and the example of a comparison are given and this invention is explained below at a detail, this invention is not limited to these.

The dryblend of the example 1 propylene homopolymer (no BUREN FS[by Sumitomo Chemical Co., Ltd.]-2011D) 70 weight section, the white color pellet (Dainippon Ink & Chemicals, Inc. PEONY) 10 weight section, and the master pellet (PERESUTATTO 3170 by Sanyo Chemical Industries, Ltd.) 20 weight section containing a polyether ester amide was carried out, it extruded with the resin temperature of 220 degrees C, and the film with a thickness of 100 micrometers was fabricated with T mold dice extrusion-molding machine (40mmphi). The silicone system release agent (KNS by Shin-Etsu Chemical Co., Ltd. -309/PL-8=100 / double quantitative ratio mixture) was applied to one side of a film by the thickness of 1.0 micrometers, the styrene-isoprene copolymer system binder (made in [Yasuhara Chemical] Clayton 1107 made from Shell Chemistry/ chestnut ARON M-105=50/50 pile quantitative ratio mixture) was applied to another field by the thickness of 50 micrometers, and the adhesive tape for display was obtained.

[0036] The base material which consists of combination as shown in one to examples 2-5 and example of comparison 4 tables 1 or 2 was used, and the adhesive tape for display was obtained like the example 1.

[0037]

[A table 1]

実施例	主成分 (配合量)	着色剤 (配合量)	帯電防止剤 (配合量)
1	プロピレン (70)	カラーペレット (10)	ホリエーテルエステルアミド (20)
2	プロピレン (80)	カラーペレット (10)	ホリエーテルエステルアミド (10)
3	エチレン-プロピレン (70)	カラーペレット (10)	ホリエーテルエステルアミド (20)
4	プロピレン (70)	カラーペレット (10)	アイオノマー (20)
5	プロピレン (80)	カラーペレット (10)	アイオノマー (10)

[0038]

[A table 2]

比較例	主成分 (配合量)	着色剤 (配合量)	帯電防止剤 (配合量)
1	プロピレン (90)	カラーペレット (10)	—
2	エチレン-プロピレン (90)	カラーペレット (10)	—
3	エチレン-プロピレン (80)	カラーペレット (10)	プラスチック用 1 (10)
4	エチレン-プロピレン (80)	カラーペレット (10)	プラスチック用 2 (10)

[0039] The semantics of each abbreviation in tables 1 and 2 is shown below. Moreover, all the loadings in a table are the weight sections.

Principal-component propylene: Propylene homopolymer (no BUREN FS[by Sumitomo Chemical Co., Ltd.]-2011D)

Ethylene-propylene: Ethylene-propylene random copolymer (no BUREN S-131 by Sumitomo Chemical Co., Ltd.)

Coloring-agent color pellet: White color pellet (PEONY by Dainippon Ink & Chemicals, Inc.)

Antistatic-agent polyether ester amide: The master pellet containing a polyether ester amide (PERESUTATTO 3170 by Sanyo Chemical Industries, Ltd.)

Ionomer: Un-charging nature ethylene copolymer ionomer resin which makes alkali metal the ion source (Mitsui and DEYUPON poly chemical SD- 100)

One for plastics: The antistatic agent (REJISUTATTO PE 132 by Dai-Ichi Kogyo Seiyaku Co., Ltd.) / ethylene-propylene random copolymer for plastics of a polyhydric-alcohol system derivative (no BUREN S-131 by Sumitomo Chemical Co., Ltd.) (5 weight sections / 95 weight sections) Two for thing plastics masterbatch-ized with the 2 shaft kneading machine: What masterbatch-ized the antistatic agent (REJISUTATTO PE 139 by Dai-Ichi Kogyo Seiyaku Co., Ltd.) / ethylene-propylene random copolymer for plastics of a polyhydric-alcohol system derivative (no BUREN S-131 by Sumitomo Chemical Co., Ltd.) (5 weight sections / 95 weight sections) with the 2 shaft kneading machine [0040] Each characteristic test to the adhesive tape for display obtained in the examples 1-5 and the examples 1-4 of a comparison of the example above of an experiment was performed as follows. The obtained result is shown in a table 3.

** Adhesive tape for display saved for two days at the adhesion room temperature (room temperature preservation article), And the adhesive tape for display (preservation article (70 degrees C, 2d)) saved for two days at 70 degrees C Cut into 20mm width of face, respectively, and make a stainless plate carry out 1 **** of 2kg platens, and they are stuck on it. A part for 300mm/in hauling rate and conditions with an exfoliation include angle of 180 degrees pulled after 30-minute neglect at 23 degrees C, and adhesion (adhesion of a room temperature preservation article and a preservation article (70 degrees C, 2d) is set to A1 and A2, respectively) was measured with the testing machine. The decreasing rate of a bottom type to

[0041]

[Equation 1]

$$\text{粘着力の低下率} = \frac{A1 - A2}{A1} \times 100$$

[0042] ** Viewing estimated the existence of the contamination in the stainless plate front face after exfoliating the adhesive tape for display (preservation article (70 degrees C, 2d)) obtained by the adhesion test of the stain resistance above to adherend.

O :contamination nothing, x : those with contamination [0043] ** Surface-electrical-resistance value JIS K According to the regular approach, the surface-electrical-resistance value of the front face of the adhesive tape for display, i.e., a mold release processing side, was measured under the ambient atmosphere of 25 degrees C and 65%RH to 6911 "the thermosetting plastic commercial-test approach."

[0044] ** The adhesive tape for surface dirt nature display was cut into width-of-face [of 50mm] x die length of 2m, this was stuck on the floor line of the administration building which carried out urethane paint, and the dirt on the front face of a tape of one week after was judged visually.

O :dirt nothing, x : those with dirt [0045]

[A table 3]

	粘着力 (gf/20mm)			被着体 への 汚染性	表面 抵抗値 (Ω)	表面 汚れ性
	室温 保存品	保存品 (70℃,2日)	低下率 (%)			
実施例 1	2200	2100	5	○	2×10^{11}	○
実施例 2	2250	2160	4	○	5×10^{12}	○
実施例 3	2000	1900	5	○	3×10^{11}	○
実施例 4	2240	2120	5	○	2×10^{11}	○
実施例 5	2300	2180	5	○	7×10^{12}	○
比較例 1	2400	2300	4	○	6×10^{16}	x
比較例 2	2000	1910	5	○	4×10^{16}	x
比較例 3	1900	620	67	x	2×10^{11}	○
比較例 4	1850	430	77	x	2×10^{11}	○

[0046] It turned out that the front face of adhesive tape dirt-comes to be easy when it is adhesive tape with a surface-electrical-resistance value higher than a table 3 (examples 1 and 2 of a comparison), and the contamination to adherend is caused when the decreasing rate of adhesion is large adhesive tape (examples 3 and 4 of a comparison). In the case of this invention, compared with this, it turned out that dirt does not adhere to a tape front face since the surface-electrical-resistance value is low, and adherend is not polluted since the decreasing rate of adhesion is small.

[0047]

[Effect of the Invention] By this invention, there is little generating of deleterious material, such as dioxin by incineration, the decreasing rate of adhesion is small, and the adhesive tape for display which has the antistatic effectiveness can be offered. Thereby, the adhesive tape for display of this invention can be used by works, a store, the administration building, the gymnasium, the works site, a yard, etc.

[Translation done.]

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TECHNICAL FIELD

[Field of the Invention] This invention relates to the adhesive tape for display which has an antistatic function. This invention does not generate deleterious material, such as dioxin, at the time of incineration, but relates to the adhesive tape for display which adhesion of the dust by static electricity or dust does not produce.

[0002]

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PRIOR ART

[Description of the Prior Art] The adhesive tape for display carries out risk by the line tape, a construction site, a yard which display a partition to the floor line of works, a store, an administration building, a gymnasium, etc., and is used for the tape of a female truck pattern etc. As for the old adhesive tape for display, the vinyl chloride is mainly used as a base material. However, since a vinyl chloride generates deleterious material, such as dioxin, at the time of incineration, many alternatives of a raw material are considered recently and an alternative is progressing to polypropylene etc.

[0003] However, polypropylene, polyethylene, etc. tend to be charged from the height of the surface-electrical-resistance value, and dust and dust tend to adhere with static electricity. For this reason, since a front face spoiled dirt and a fine sight when polypropylene etc. is used for the adhesive tape for display, polypropylene etc. was a raw material which is not suitable. It is performed that scour antistatic agents, such as a conductive filler and a surfactant, in a base material or a binder layer, and it is crowded in it as the solution approach of this problem. When a conductive filler is scoured as an antistatic agent and it is crowded, in order to acquire the antistatic effectiveness which the color as an object for display cannot take out easily vividly, and makes the object, it must add to a large quantity and leads also to a steep manufacturing-cost rise.

[0004] On the other hand, when antistatic agents, such as a surface active agent, are scoured and it is crowded, a surface active agent etc. carries out bleed out to a front face, static electricity is missed from there, and the antistatic effectiveness is demonstrated. However, since it is generally low molecular weight, the amount of bleed out of a surface active agent is not stable, and when the antistatic effectiveness changes or a front face is wiped off, it has the fault that the antistatic effectiveness is lost. Moreover, if the adhesive tape which scoured the surfactant to the base material and was crowded is rewound in the shape of a roll, a surfactant will shift to a binder layer front face, and there is a fatal problem that adhesion declines greatly.

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EFFECT OF THE INVENTION

[Effect of the Invention] By this invention, there is little generating of deleterious material, such as dioxin by incineration, the decreasing rate of adhesion is small, and the adhesive tape for display which has the antistatic effectiveness can be offered. Thereby, the adhesive tape for display of this invention can be used by works, a store, the administration building, the gymnasium, the works site, a yard, etc.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] Therefore, as for the object of this invention, there is little generating of deleterious material, such as dioxin, at the time of incineration, and its decreasing rate of adhesion is small, and it is offering the adhesive tape for display which moreover has an antistatic function.

[Translation done.]

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MEANS

[Means for Solving the Problem] In order that this invention persons may attain the above-mentioned object, as a result of inquiring wholeheartedly, the adhesive tape whose decreasing rate of adhesion it is the adhesive tape which comes to arrange a binder layer on one side of the base material which contains polyolefine as a principal component, and the surface-electrical-resistance value of this base material is 1×10^{14} ohms or less, and is 20% or less came to complete a header and this invention for it being the adhesive tape for display which has a desired property. Namely, this invention is adhesive tape which comes to arrange a binder layer on one side of the base material which contains polyolefine as (1) principal component. The adhesive tape for display characterized by for the surface-electrical-resistance value of this base material being 1×10^{14} ohms or less, and the decreasing rate of adhesion being 20% or less, (2) Adhesive tape for display of the above (1) characterized by polyolefines being polyethylene and/or polypropylene, (3) Adhesive tape for display of the above (1) characterized by a base material containing a macromolecule mold antistatic agent, (4) Adhesive tape for display of the above (3) with which the loadings of a macromolecule mold antistatic agent are characterized by being 5 - 50 weight section to the polyolefine 100 weight section which is the principal component of a base material, (5) The above (3) or (4) adhesive tape for display with which a macromolecule mold antistatic agent is characterized by being a polyether ester amide, (6) The above (3) or (4) adhesive tape for display with which a giant-molecule mold antistatic agent is characterized by being un-charging nature ethylene copolymer ionomer resin, (7) Adhesive tape for display of above-mentioned (1) - (6) whose base material is multilayer structure, (8) It is the adhesive tape which comes to arrange a binder layer on one side of the base material which contains polyolefine as a principal component. The adhesive tape for display which contains a macromolecule mold antistatic agent in this base material, and is characterized by the surface-electrical-resistance value of this base material being 1×10^{14} ohms or less, (9) Adhesive tape for display of the above (8) characterized by polyolefines being polyethylene and/or polypropylene, (10) Adhesive tape for display of the above (8) with which the loadings of a macromolecule mold antistatic agent are characterized by being 5 - 50 weight section to the polyolefine 100 weight section which is the principal component of a base material, (11) Adhesive tape for display of the above (8) with which a macromolecule mold antistatic agent is characterized by being a polyether ester amide, (12) It is related with the adhesive tape for display of the above (8) with which a giant-molecule mold antistatic agent is characterized by being un-charging nature ethylene copolymer ionomer resin, and the adhesive tape for display of above-mentioned (8) - (12) whose (13) base materials are multilayer structure.

[0007]

[Embodiment of the Invention] Hereafter, this invention is explained to a detail. The surface-electrical-resistance value of the base material in this invention is the bottom of 25 degrees C and 65%RH condition, and JIS. It is the value measured by K6911, and 1×10^{14} ohms or less are 1×10^{13} ohms or less especially preferably preferably. When the surface-electrical-resistance value of a base material exceeds 1×10^{14} ohms, a front face dirt-comes to be [with static electricity] easy of the adhesive tape which has this base material with adhesion of dust, dust, etc.

[0008] The decreasing rate of the adhesion of the adhesive tape for display in this invention is 10% or less preferably 20% or less. It is computed by the adhesion measured with the after-mentioned measuring method, and the difference of the adhesion of the preservation article (70 degrees C, 2d) (adhesive tape for display saved for two days at 70 degrees C) to the adhesion of a room temperature preservation article (adhesive tape for display saved for two days at the room temperature) is indicated to be ** "the decreasing rate of adhesion" by the percentage to the adhesion of a room temperature preservation article.

[0009] As an approach of setting the surface-electrical-resistance value of the base material in this invention to 1×10^{14} ohms or less, ** surface active agent is applied to a base material front face, or the approach of blending with a base material conductive matter which scours to a base material, and is been [matter / it / is made full / matter / and] sufficient and used as it, such as an approach and ** carbon black metallurgy group, and the approach of blending ** macromolecule mold antistatic agent with a base material are mentioned, and the approach of the above-mentioned ** is mentioned preferably.

[0010] As an approach of making the decreasing rate of the adhesion of the adhesive tape for display in this invention 20% or less, the approach of blending ** conductivity matter with adhesive tape and the approach of blending ** macromolecule mold antistatic agent with adhesive tape are mentioned, and the approach of the above-mentioned ** is preferably desirable from the point of transparency or coloring nature. In addition, when it scoured to adhesive tape, and it is crowded or carries out [**** / applying a surfactant to an adhesive tape front face], the decreasing rate of adhesion will exceed 20%.

[0011] As a macromolecule mold antistatic agent used by this invention, a polyether ester amide and an ionomer are mentioned preferably.

[0012] The polyether ester amide in this invention carries out the polycondensation of the polyamide which has the reactant end guided from a polyamide plasticity monomer and dicarboxylic acid, and the polyether diol which has a reactant end, is obtained, and includes not only random copolymerization but a block copolymer.

[0013] As this polyamide plasticity monomer, amino carboxylic acids (for example, omega-aminocaproic acid, omega-amino enanthic acid, omega-amino caprylic acid, omega-amino ** RARUGON acid, omega-amino capric acid, 11-amino undecanoic acid, 12-amino dodecanoic acid, etc.), lactams (for example, a caprolactam, an ENANTO lactam, a RAURO lactam, an undecane lactam, etc.), nylon salt (for example, hexamethylenediamine-adipate, a hexamethylenediamine-sebacic-acid salt, a hexamethylenediamine-terephthalic-acid salt, etc.), etc. are mentioned, for example. These may use together independent or two sorts or more. Among these, as a desirable thing, aliphatic series polyamide plasticity monomers, such as omega-aminocaproic acid, 12-amino dodecanoic acid, a caprolactam, a RAURO lactam, and hexamethylenediamine-adipate, are mentioned, and a caprolactam is mentioned especially preferably.

[0014] the dicarboxylic acid (for example, 1 and 2-cyclohexane dicarboxylic acid —) which has cyclic structure in intramolecular as dicarboxylic acid, for example To 1, 4-cyclohexane dicarboxylic acid, and JISHIKURO, KISHIRU -4, 4'-dicarboxylic acid, A terephthalic acid, isophthalic acid, a phthalic acid, naphthalene -2, 7-dicarboxylic acid, Difenoxycarboxylic acid, diphenyl -4, 4'-dicarboxylic acid, 3-sulfoisophtharate sodium, 3-sulfoisophtharate potassium, And the shape of a straight chain, branched-chain dicarboxylic acid, etc. (for example, an adipic acid, an azelaic acid, a sebacic acid, a UNDEKANJI acid, DODEKANJI acids, two or more sorts of such mixture, etc.) which does not have cyclic structure are mentioned to intramoleculars, such as two or more sorts of such mixture. These may use together independent or two sorts or more.

[0015] The polyamide of this invention can be manufactured like the manufacture approach of the usual polyamide. the number average molecular weight of this polyamide — 300-10000 — it is 500-5000 preferably.

[0016] As polyether diol in this invention, the alkylene oxide addition product of polyoxy alkylene glycol and bisphenols is mentioned preferably, these being independent or two sorts or more may be used together, and the alkylene oxide addition product of bisphenols is mentioned especially preferably. As this polyoxy alkylene glycol, polyoxy ethylene glycol, a polyoxypropylene glycol,

polyoxy ethylene oxide and polyoxy propylene oxide, two or more sorts of such mixture, etc. are mentioned, for example. Polyoxy ethylene glycol is [among these] desirable especially from the point of antistatic nature. As an alkylene oxide addition product of these bisphenols, the ethylene oxide addition product of bisphenols, such as bisphenol A (4 and 4'-dihydroxydiphenyl -2, 2-propane), Bisphenol F (4 and 4'-dihydroxy diphenylmethane), Bisphenol S (4 and 4'-dihydroxy diphenylsulfone), 4, and 4'-dihydroxydiphenyl -2 and 2-butane, is mentioned, for example, and bisphenol A and the ethylene oxide addition product of Bisphenol S are mentioned preferably. If it is the range which does not check the object of this invention, dihydroxy compounds other than these may be included, for example, ethylene glycol, propylene glycol, butanediol, a diethylene glycol, cyclohexane diol, a hydrogenation poly butane diene glycol, etc. will be mentioned.

[0017] The number average molecular weight of polyether diol is 300-5000 preferably.

[0018] The polyether ester amide used by this invention can be obtained by the following approaches. ** The approach of the above-mentioned polyamide plasticity monomer and dicarboxylic acid of making it reacting, obtaining a polyamide, adding polyether diol to this, and performing a polymerization reaction under an elevated temperature and reduced pressure. ** How to teach the above-mentioned polyamide plasticity monomer, dicarboxylic acid, and polyether diol simultaneously to a reaction vessel, to make a polyamide form in the bottom of existence of water or nonexistence as an intermediate product by carrying out an application-of-pressure reaction at an elevated temperature, and to perform the polymerization reaction of this polyamide and polyether diol under reduced pressure after that.

[0019] On the occasion of the above-mentioned polymerization reaction, an esterification catalyst is usually used. As this catalyst, the organic-acid salt of proton acid, such as a phosphoric acid, alkali metal, alkaline earth metal, transition metals, 2B metal, 4B metals, and 5B metals, a carbonate, a sulfate, phosphate, an oxide, a chloride, a hydroxide, an alkoxide, etc. are mentioned. The amount of this catalyst used is usually 0.001 - 5 % of the weight to the sum total weight of a polyamide plasticity monomer, dicarboxylic acid, and polyether diol.

[0020] The addition to the base material of this polyether ester amide makes the same component as the constituent of a masterbatch or the polyolefine which is the principal component of a base material distribute an antistatic agent, and is performed via what was made into the pellet type (it considers as a master pellet hereafter). As this master pellet, for example, the "PERESUTATTO series" by Sanyo Chemical Industries, Ltd. can be used.

[0021] The un-charging nature ethylene copolymer ionomer resin in this invention is un-charging nature ethylene copolymer ionomer resin which makes alkali metal the ion source, and the thing of the structure neutralized with alkali metal is said, and a part or all of a carboxyl group of ethylene and an unsaturated-carboxylic-acid random copolymer will not be restricted especially if it has the antistatic effectiveness. This ionomer does not need to be neutralized by the cation in all the carboxyl groups to contain.

[0022] As the above-mentioned unsaturated carboxylic acid, an acrylic acid, a methacrylic acid, etc. are mentioned preferably. As the above-mentioned alkali metal, a lithium, sodium, a potassium, etc. are mentioned preferably.

[0023] the polyolefine 100 weight section whose loadings of the macromolecule mold antistatic agent in a base material are the principal component of a base material — receiving — 5 - 50 weight section — it is 5 - 30 weight section preferably. If the loadings of this polyether ester amide become under 5 weight sections to the polyolefine 100 weight section which is the principal component of a base material, the antistatic effectiveness will become scarce, if 50 weight sections are exceeded, the physical properties (tensile strength, the rate of expanding, an elastic modulus, and tear strength) of a base material will change a lot, and cost will become high further.

[0024] The principal component of the base material used by this invention is polyolefine, as this polyolefine, such mixture is mentioned to the copolymer of olefins, such as polyethylene, polypropylene; ethylene propylene rubber, an ethylene-vinylacetate copolymer, an ethylene-methacrylic-acid copolymer, a propylene-vinyl acetate copolymer, and a propylene-methacrylic-

mentioned to polyethylene, polypropylene, ethylene propylene rubber, and a list, for example.

[0025] The coloring agent for display can be added in the base material in the adhesive tape for display of this invention. the coloring agent used by this invention is usually used, and is easy to be marketed — it scours, and it is crowded, a mold color pigment etc. is mentioned, and the dryblend of a pellet is mentioned as an addition gestalt to a base material.

[0026] the amount of the coloring agent used — the base material 100 weight section — receiving — 1 – 50 weight section — it is 2 – 30 weight section preferably.

[0027] The base material of this invention contains polyolefine as a principal component, and contains a coloring agent and an antistatic agent further. Furthermore, an anti-oxidant, an ultraviolet ray absorbent, lubricant, an antiblocking agent, etc. may be contained as additives other than a coloring agent and an antistatic agent in the range which does not check the object of this invention if needed.

[0028] The base material of this invention can be generated by the usual shaping approach, for example, extrusion molding (for example, a tubular film process, a T-die method), calendering, etc. are mentioned, and molding temperature is 200–270 degrees C. [0029] The adhesive tape of this invention may consist of a binder layer and a base material, and surface treatment which raises adhesive properties, such as corona discharge, to the field which touches the binder of this base material as occasion demands may be performed. Moreover, surface treatment which mitigates rewinding [of spreading of a release agent etc.] may be performed to the field which does not touch the binder of this base material as occasion demands.

[0030] Acrylic, a natural rubber system, a synthetic-rubber system, an ethylene-vinylacetate copolymer, an ethylene-acrylic ester system, a styrene-isoprene block-copolymer system, and a styrene-butadiene block-copolymer system are mentioned, two or more sorts may be used and the binder used by this invention should just choose these from these according to one sort or the adherend to stick.

[0031] In the binder of this invention, additives, such as a slipping agent and an antioxidant, may be contained if needed.

[0032] The adhesive tape for display of this invention can be obtained by applying this to the base material fabricated by the above-mentioned approach, after being able to carry out like the production approach of the usual adhesive tape, for example, carrying out heating fusion of the binder.

[0033] The thickness of a base material and a binder layer changes with applications, 10–2000 micrometers of thickness of a base material are 30–800 micrometers preferably, and 5–300 micrometers of thickness of a binder layer are 10–180 micrometers preferably.

[0034] The base material of this invention is a monolayer or multilayer structure, and that the surface-electrical-resistance value of the outermost layer of drum of the side which does not arrange the binder layer at least in the base material of multilayer structure should just be 1×10^{14} ohms or less, as long as it is range which does not check the object of this invention, it may arrange the 3rd layer other than the layer which contains the above-mentioned polyolefine as a principal component in addition to an outermost layer of drum. If it is the layer which consists of a binder and good resin of adhesion as the 3rd layer, there will be especially no definition.

[Translation done.]

* NOTICES *

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- 1.This document has been translated by computer. So the translation may not reflect the original precisely.
- 2.**** shows the word which can not be translated.
- 3.In the drawings, any words are not translated.

EXAMPLE

[Example] Although an example and the example of a comparison are given and this invention is explained below at a detail, this invention is not limited to these.

The dryblend of the example 1 propylene homopolymer (no BUREN FS[by Sumitomo Chemical Co., Ltd.]-2011D) 70 weight section, the white color pellet (Dainippon Ink & Chemicals, Inc. PEONY) 10 weight section, and the master pellet (PERESUTATTO 3170 by Sanyo Chemical Industries, Ltd.) 20 weight section containing a polyether ester amide was carried out, it extruded with the resin temperature of 220 degrees C, and the film with a thickness of 100 micrometers was fabricated with T mold dice extrusion-molding machine (40mmphi). The silicone system release agent (KNS by Shin-Etsu Chemical Co., Ltd. -309/PL-8=100 / double quantitative ratio mixture) was applied to one side of a film by the thickness of 1.0 micrometers, the styrene-isoprene copolymer system binder (made in [Yasuhara Chemical] Clayton 1107 made from Shell Chemistry/ chestnut ARON M-105=50/50 pile quantitative ratio mixture) was applied to another field by the thickness of 50 micrometers, and the adhesive tape for display was obtained.

[0036] The base material which consists of combination as shown in one to examples 2-5 and example of comparison 4 tables 1 or 2 was used, and the adhesive tape for display was obtained like the example 1.

[0037]

[A table 1]

実施例	主成分 (配合量)	着色剤 (配合量)	帯電防止剤 (配合量)
1	プロピレン (70)	カラーペレット (10)	ホリエーテルエステルアミド (20)
2	プロピレン (80)	カラーペレット (10)	ホリエーテルエステルアミド (10)
3	エチレン-プロピレン (70)	カラーペレット (10)	ホリエーテルエステルアミド (20)
4	プロピレン (70)	カラーペレット (10)	アイオノマー (20)
5	プロピレン (80)	カラーペレット (10)	アイオノマー (10)

[0038]

[A table 2]

比較例	主成分 (配合量)	着色剤 (配合量)	帯電防止剤 (配合量)
1	プロピレン (90)	カラーペレット (10)	—
2	エチレン-プロピレン (90)	カラーペレット (10)	—
3	エチレン-プロピレン (80)	カラーペレット (10)	プラスチック用 1 (10)
4	エチレン-プロピレン (80)	カラーペレット (10)	プラスチック用 2 (10)

[0039] The semantics of each abbreviation in tables 1 and 2 is shown below. Moreover, all the loadings in a table are the weight sections.

Principal-component propylene: Propylene homopolymer (no BUREN FS[by Sumitomo Chemical Co., Ltd.]-2011D)

Ethylene-propylene: Ethylene-propylene random copolymer (no BUREN S-131 by Sumitomo Chemical Co., Ltd.)

Coloring-agent color pellet: White color pellet (PEONY by Dainippon Ink & Chemicals, Inc.)

Antistatic-agent polyether ester amide: The master pellet containing a polyether ester amide (PERESUTATTO 3170 by Sanyo Chemical Industries, Ltd.)

Ionomer: Un-charging nature ethylene copolymer ionomer resin which makes alkali metal the ion source (Mitsui and DEYUPON poly chemical SD- 100)

One for plastics: The antistatic agent (REJISUTATTO PE 132 by Dai-Ichi Kogyo Seiyaku Co., Ltd.) / ethylene-propylene random copolymer for plastics of a polyhydric-alcohol system

derivative (no BUREN S-131 by Sumitomo Chemical Co., Ltd.) (5 weight sections / 95 weight sections) Two for thing plastics masterbatch-ized with the 2 shaft kneading machine: What

masterbatch-ized the antistatic agent (REJISUTATTO PE 139 by Dai-Ichi Kogyo Seiyaku Co., Ltd.) / ethylene-propylene random copolymer for plastics of a polyhydric-alcohol system

derivative (no BUREN S-131 by Sumitomo Chemical Co., Ltd.) (5 weight sections / 95 weight sections) with the 2 shaft kneading machine [0040] Each characteristic test to the adhesive tape

for display obtained in the examples 1-5 and the examples 1-4 of a comparison of the example above of an experiment was performed as follows. The obtained result is shown in a table 3.

** Adhesive tape for display saved for two days at the adhesion room temperature (room temperature preservation article), And the adhesive tape for display (preservation article (70 degrees C, 2d)) saved for two days at 70 degrees C Cut into 20mm width of face, respectively, and make a stainless plate carry out 1 **** of 2kg platens, and they are stuck on it. A part for 300mm/in hauling rate and conditions with an exfoliation include angle of 180 degrees pulled after 30-minute neglect at 23 degrees C, and adhesion (adhesion of a room temperature preservation article and a preservation article (70 degrees C, 2d) is set to A1 and A2, respectively) was measured with the testing machine. The decreasing rate of a bottom type to the acquired adhesion (A1, A2) and adhesion was computed.

[0041]

[Equation 1]

$$\text{粘着力の低下率} = \frac{A1 - A2}{A1} \times 100$$

[0042] ** Viewing estimated the existence of the contamination in the stainless plate front face after exfoliating the adhesive tape for display (preservation article (70 degrees C, 2d)) obtained by the adhesion test of the stain resistance above to adherend.

O :contamination nothing, x : those with contamination [0043] ** Surface-electrical-resistance value JIS K According to the regular approach, the surface-electrical-resistance value of the front face of the adhesive tape for display, i.e., a mold release processing side, was measured under the ambient atmosphere of 25 degrees C and 65%RH to 6911 "the thermosetting plastic commercial-test approach."

[0044] ** The adhesive tape for surface dirt nature display was cut into width-of-face [of 50mm] x die length of 2m, this was stuck on the floor line of the administration building which carried out urethane paint, and the dirt on the front face of a tape of one week after was judged visually.

O :dirt nothing, x : those with dirt [0045]

[A table 3]

	粘着力 (gf/20mm)			被着体 への 汚染性	表面 抵抗値 (Ω)	表面 汚れ性
	室温 保存品	保存品 (70℃, 2日)	低下率 (%)			
実施例 1	2200	2100	5	○	2×10^{11}	○
実施例 2	2250	2160	4	○	5×10^{13}	○
実施例 3	2000	1900	5	○	3×10^{11}	○
実施例 4	2240	2120	5	○	2×10^{11}	○
実施例 5	2300	2180	5	○	7×10^{13}	○
比較例 1	2400	2300	4	○	6×10^{16}	×
比較例 2	2000	1910	5	○	4×10^{16}	×
比較例 3	1900	620	67	×	2×10^{11}	○
比較例 4	1850	430	77	×	2×10^{11}	○

[0046] It turned out that the front face of adhesive tape dirt-comes to be easy when it is adhesive tape with a surface-electrical-resistance value higher than a table 3 (examples 1 and 2 of a comparison), and the contamination to adherend is caused when the decreasing rate of adhesion is large adhesive tape (examples 3 and 4 of a comparison). In the case of this invention, compared with this, it turned out that dirt does not adhere to a tape front face since the surface-electrical-resistance value is low, and adherend is not polluted since the decreasing rate of adhesion is small.

[Translation done.]